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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
LAM, ANN Y	

ART UNIT	PAPER NUMBER
1641	

DATE MAILED: 03/08/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/872,052	MATSON ET AL.	
	Examiner	Art Unit	
	Ann Y. Lam	1641	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 December 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *55-71* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *55-71* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

1. Claims 55-71 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicants' admission on page 7 (first two full paragraphs) of Applicants' response of May 23, 2005, in view of Swayze et al., 6,316,626.

Page 7 of Applicants' response states that:

> "Prior to the present invention, it was generally understood in the art that the attachment of biopolymers via available terminal amino groups may lead to inefficient and unstable attachment or to reduced activity of the attached biomolecule. Since biopolymers contact supports in a random orientation, the terminal attachment of biopolymers may suffer from low stability and efficiency.
>
> Because of the possible low attachment efficiency and reduction in biomolecule activity of terminal attachments via naturally present amino groups, this methodology has been abandoned years ago in favor of using post-modified or derivatized biomolecules."

Thus, Applicants' have admitted that the invention of attaching unmodified biopolymers to a solid support was known or used by others in this country before the invention thereof by Applicants.

However, Applicant's admission does not mention the use of acyl fluoride to attach the biopolymer to the solid support. Swayze et al. however teaches the use of acyl fluoride to functionalize a solid support to further attach molecules.

Swayze et al. teaches that acyl fluorides are useful coupling agents for coupling biopolymers to a solid support (col. 2, lines 60-63, and col. 108, lines 31-53.) It would have been obvious to one of ordinary skill in the art to attach unmodified biopolymers to a solid support, as is well known or used in the public as admitted by Applicants, by means of derivatized acyl fluoride, as taught by Swayze et al. because Swayze et al. teaches that acyl fluoroides provide the advantage of coupling biopolymers to a solid support.

As to the following claims, Swayze et al. discloses the limitations as follows.

As to claim 56, the biopolymers are nucleic acids (col. 2, line 63.)

As to claims 57 and 58, the biopolymers are polynucleotides (col. 2, line 63.)

As to claim 59, the polynucleotide is single or double stranded DNA (col. 2, line 63.)

As to claims 60 and 71, the biopolymers may be the same or different.

As to claim 61, the solid support is of polymeric materials (col. 35, lines 41-42.)

As to claim 62, the solid support is carboxylated PVDF, carboxylated polypropylene or carboxylated polyethylene, (col. 35, lines 43-44, and col. 36, lines 6-8.)

As to claim 63, the solid support is in the form of plates (i.e., well plates, col. 133, lines 57-61.)

As to claim 64, the solid support is fabricated from plastic in the form of a planar device having discrete isolated areas in the form of wells (col. 35, lines 41-42, and col. 133, lines 57-61.)

As to claim 65, the solid support is a microplate (col. 133, lines 57-61.)

As to claim 67, the plastic is polystyrene or polyethylene (col. 42-43.)

As to claims 68-70, the biopolymers are attached to different, discrete, isolated areas to form an array (col. 49, lines 54-58.)

2. Claims 55-71 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barany et al., 6,852,487, in view of Swayze et al., 6,316,626.

Barany et al. discloses the invention substantially as claimed. More specifically, as to claim 55, Barany et al. discloses a plurality of biopolymer and a solid support (col 23, line 21), wherein the solid support has at least one surface comprising pendant acyl halide functionalities (col. 23, line 23), and wherein an unmodified end of the biopolymer is attached to the solid support by reaction with the pendant acyl halide functionalities in the absence of a spacer arm, (col. 26, lines 36-39, and col. 23, lines 20-23, disclosing the attachment of pre-synthesized probes, and col. 32, lines 25-28, disclosing spotting of oligomers to a solid support.)

As to claim 56, the biopolymers are nucleic acids (col. 26, line 37.)

As to claims 57 and 58, the biopolymers are polynucleotides (col. 26, line 37.)

As to claim 59, the polynucleotide is single or double stranded DNA (col. 26, line 37.)

As to claims 60 and 71, the biopolymers may be the same or different.

As to claim 61, the solid support is of polymeric materials (col. 22, line 33.)

As to claim 62, the solid support is carboxylated PVDF, carboxylated polypropylene or carboxlated polyethylene, (col. 22, lines 14-16 and lines 51-52.)

As to claim 63, the solid support is in the form of films (col. 22, line 1.)

As to claim 64, the solid support is fabricated from plastic in the form of a planar device having discrete isolated areas in the form of wells (col. 22, lines 1-7.)

As to claim 65, the solid support is considered a microplate (col. 22, lines 6-7.)

As to claim 67, the plastic is polypropylene (col. 22, line 16.)

As to claims 68-70, the biopolymers are attached to different, discrete, isolated areas to form an array (col. 9, lines 42-44.)

Although Barany et al. teaches that the surface of the solid substrate is functionalized with binding members, such as acyl halide (col. 22, lines 36-40), Barany et al. does not specifically disclose that the halide is fluoride (as claimed in claim 55 and 66.) Swayze et al. however teaches this limitation.

Swayze et al. teaches that acyl halides such as acyl fluorides are useful coupling agents for coupling biopolymers to a solid support (col. 2, lines 60-63, and col. 108, lines 31-53.) It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize acyl fluoride in the Barany et al. method, as taught by Swayze et al., as the acyl halide generally disclosed by Barany et al., because Swayze

teaches that acyl fluoride provides the advantage of functionalizing a solid substrate such as the Barany et al. polymer solid substrate, in order to immobilize biomolecules.

Response to Arguments

Applicant's arguments with respect to the rejections have been fully considered but are not persuasive. Applicant argues on page 6 that Applicant's statement (on page 7 of the response on May 23, 2005) indicates that it is at least unpredictable prior to the present invention that a biopolymer could be efficiently immobilized directly on a support without modification and without use of linkers. Applicant goes on to assert that Applicant's statement supports that a person of ordinary skill in the art would not think that biopolymers could be efficiently immobilized directly on substrates without modification and without use of linkers and that if anyone had attempted to attach unmodified biopolymers to a solid support, such attempt was unsuccessful and was abandoned. Applicant moreover argues that the statement as a whole must be considered including portions that would lead away from the claimed invention. Thus, Applicant submits that the statement as a whole indicated that one skilled in the art could not have predicted with certainty that biopolymers could be efficiently immobilized directly on supports without modifications and without use of linkers.

This argument is not persuasive because Applicant's statement nevertheless admits that the invention of attaching unmodified biopolymers to a solid support was known or used by others in this country before the invention by Applicant.

Applicant also argues that Swayze also does not teach immobilizing biopolymers directly on to a solid support. This argument is not persuasive because this limitation is admitted in Applicant's statement as indicated above. Applicant further submits that Swayze fails to teach or suggest the use of acyl fluoride to functionalize a solid support to further attach a biopolymer. Applicant argues on page 8 that in Swayze, there are not acyl fluoride functionalities on the solid support. Applicant argues (on page 8 as well as page 11) that the acyl fluoride instead is used as a coupling agent in order to introduce acyl groups onto an amino group on a scaffold and furthermore it is the scaffold and not the solid support that reacts with the acyl fluoride. This argument is not persuasive because the solid support has pendant acyl fluoride functionalities and the biopolymer is attached to the solid support by reaction with the pendant acyl fluoride functionalities, as claimed by Applicant. Moreover, a scaffold itself is equivalent to a solid support and thus Swayze teaches using pendant acyl fluoride functionalities to attach a biopolymer to a solid support (see col. 108, lines 31-53).

Applicant also argues on page 9 that Barany at column 26, lines 7-20 states that the DNA oligonucleotides are terminated with a residue of the amino acid tryptophan and conjugated efficiently to supports that have been modified. Barany also states that in one variation, the terminus of amino functionalized DNA is modified by bromoacetic anhydride and that the bromoacetyl function is captured by readily established thiol groups on the support. Applicant also cites column 26, lines 36-47 wherein Barany cites use of linker arms.

These arguments are not persuasive because Barany lists these as alternative examples of how oligonucleotides can be attached to a solid support. Barany on column 26, lines 36-40, states that the solid supports must be charged with DNA oligonucleotides or PNA oligomers and that this is achieved either by attachment of pre-synthesized probes **or** by direct assembly and side-chain deprotection. Thus the direct assembly and side-chain deprotection are only an alternative to the attachment of pre-synthesized probes, which are not modified. The Office also emphasizes that Barany cites use of acyl halide to functionalize solid substrates (col. 22, line 40). The Office also emphasizes that Barany on column 24, lines 61-66, states that functional groups (such as acyl halide) serve as starting points for oligonucleotides that will ultimately be coupled to the support. These functional groups can be reactive with an organic group that is to be attached to the solid support or it can be modified to be reactive with that group, as through the use of linkers or handles. The paragraphs that Applicant recites as noted above (that is column 26, lines 36-40 and lines 36-47) are giving examples of use of linkers, which is only optional, i.e., an alternative embodiment (see col. 26, line 64-66 and col. 25, lines 14-16.)

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ann Y. Lam whose telephone number is 571-272-0822. The examiner can normally be reached on M-Sat 11-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Long Le can be reached on 571-272-0823. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A.L.

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